

CLAIMS

Sub a 1. Preform (1) allowing the obtainment after deformation of customized orthodontic or orthopedic dentofacial appliances, characterized in that it has the general form of a three-dimensional hollow body and in that it has a form that allows its expansion inside a mold reproducing the morphology of the patient.

2. Preform according to claim 1, characterized in that it has a hollow tubular or approximately tubular shape.

3. Preform according to any of claims 1 through 2, characterized in that it has a hollow tubular or approximately tubular shape, cut out at the top front part to form an opening 8.

4. Preform according to any of claims 1 through 3, characterized in that it is made of a plastic material of the thermoplastic or thermosetting type deformable by expansion.

5. Preform according to claim 4, characterized in that it is made of a thermoplastic material chosen from the group constituted by polyethylene, polypropylene, polycarbonates, methyl polymethacrylate, PVC, polyurethanes, or of a thermosetting plastic material chosen from the group constituted by methyl polymethacrylate and polyurethanes.

6. Preform according to any of claims 1 through 5, characterized in that it has on the surface guiding means, for example bosses or recesses, intended to guide the operator during the cutting operation, and/or pre-drilled holes (7) used to contain the adhesive paste for the functional appliance.

7. Preform according to any of claims 1 through 6, characterized in that it is produced in unrolled flat form before being shaped by the operator.

8. Preform according to any of the preceding claims, allowing the obtainment after

deformation of a Bonnet night lingual retainer (N.L.R.).

9. Process for producing a customized orthodontic or orthopedic dentofacial appliance, characterized in that it comprises the following stages:

- production of an expansion mold (9, 10) made at least partially from a design model or models made by the practitioner from the impression or impressions taken from his patient,
- positioning of the preform (1) according to any of claims 1 through 8 in the expansion mold,
- expansion of the preform until it has reached the desired shape,
- demolding of the appliance obtained, which becomes functional after finishing.

10. Process according to claim 9, characterized in that the expansion takes place with heat and in that the preform is brought to the softening point of its constituent material before the expansion stage, either before or after the positioning stage in the expansion mold.

11. Process according to claim 10, characterized in that the reaching of the expansion temperature is produced by the action of a radiation or a heat-exchanging liquid.

12. Process according to claim 11, characterized in that the radiation used is the microwave or ultraviolet or infrared type.

13. Process according to any of claims 9 through 12, characterized in that the expansion is produced by any appropriate means for obtaining the expansion of the preform to the desired shape.

14. Process according to claim 13, characterized in that the expansion is produced by the action of an expansion fluid or mechanically.

15. Process according to claim 14, characterized in that the expansion fluid is compressed air or water.

16. Process according to any of claims 9 through 15, characterized in that the expansion is produced by means of an expanding core (14) placed in the preform (1) and inflated by the expansion fluid.

17. Process according to claim 16, characterized in that the core has a controlled expansion (16).

18. Process according to claim 16 or 17, characterized in that the expanding core (14, 16) is made of a material resistant to the expansion temperature, for example an elastomer material.

19. Process according to any of claims 9 through 18, characterized in that the preform is made of thermosetting material and in that the expansion stage is simultaneously or subsequently accompanied by a stage for polymerizing the thermosetting material.

20. Process according to any of claims 9 through 19, characterized in that it also comprises, during the expansion, the insertion by duplicate molding of fastening pieces or complementary pieces.

21. Process according to any of claims 9 through 20, characterized in that the finishing stage comprises at least one of the following actions: creation of one or more openings, polishing, anchoring of fastening hooks, attachment of complementary pieces, elimination of the unnecessary parts, reduction of the surface of certain areas.

22. Process according to any of claims 9 through 21, characterized in that it comprises a stage for anchoring fastening hooks at movable anchor points.

23. Process according to any of claims 9 through 22, characterized in that the orthodontic or orthopedic dentofacial appliance obtained by the process during a previous cycle

is used as a preform.

24. Process according to any of claims 9 through 23, characterized in that the customized orthodontic or orthopedic dentofacial appliance obtained is a Bonnet night lingual retainer (N.L.R.).

25. Expanding core, characterized in that it is used in a process according to any of claims 16 through 24, and in that it comprises at least one means for controlling its expansion.

26. Core according to claim 25, characterized in that the means for controlling its expansion is chosen from among the following means, i.e., an increase in the thickness of its wall in certain areas and the insertion into its wall of rigid, for example metal, reinforcements.

27. Expansion device characterized in that it allows the expansion of the preform according to claims 1 through 8 until it has reached the desired shape, through the displacement of mechanical parts moved by the operator during the expansion phase.

28. Fastening hook for an orthodontic or orthopedic dentofacial appliance produced according to the process described in claims 9 through 24, characterized in that it comprises a branch called a return branch that remains outside the appliance after insertion.

29. Device for attaching fastening hooks to an orthodontic or orthopedic dentofacial appliance produced according to the process described in claims 9 through 24, characterized in that it comprises a device for supplying electrical heating energy and for stable mechanical positioning of the fastening hook to be anchored.

30. Device according to claim 29, characterized in that the supply of electrical energy is provided either by a portable current generator hand-held by the operator and comprising two rigid electrical conductors, or by a gun mechanically holding a pair of rigid electrical conductors connected by flexible conductors to a fixed generator.

31. Device according to claim 29 or 30, characterized in that the stable mechanical positioning is performed by the ends of the electrical conductors, which have the form of a clip or a shape adapted to the diameter of the wire or to the shape of the hook to be inserted, for example a fork shape.

32. Process according to claim 22, characterized in that the fastening hooks are attached according to claim 28 by means of an attaching device according to any of claims 29 through 31.

33. Customized orthodontic or orthopedic dentofacial appliance, characterized in that it is produced from a preform (1) according to any of claims 1 through 8 by means of a process according to any of claims 9 through 24 and 32.

34. Orthodontic or orthopedic dentofacial appliance according to claim 33, characterized in that it constitutes a Bonnet night lingual retainer (N.L.R.).

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